stances of erratic blocks. The erratic blocks from the higher Alps, which are found on the flanks of the Jura Mountains, are also shown to point conclusively to the former existence of glaciers stretching down the Rhone Valley as far as the Jura. The distribution of erratics in North America are next considered, and the crowning example of boulder transportation is said to be afforded by "the blocks of light grey gneiss discovered by Prof. Hitchcock on the summit of Mount Washington, over 6000 feet above sea-level, and identified with Bethlehem gneiss, whose nearest outcrop is at Jefferson, several miles to the north-west, and 3000 or 4000 feet lower than Mount Washington." After giving instances in Great Britain and Scandinavia of boulders carried above their source, Dr. Wallace says:—

> We thus find clear and absolute demonstration of glacier ice moving up-hill and dragging with it rocks from lower levels to elevations varying from 200 to 2700 feet above their origin. In Switzerland we have proof of the same general fact in the terminal moraine of the northern branch of the Rhone glacier being about 200 feet higher than the Lake of Geneva, with very much higher intervening ground. As it is universally admitted that the glacier of the Rhone did extend to beyond Soleure, all the *à priori* objections to the various cases of rocks carried much higher than their origin, in America, the British Isles, and Scandinavia, fall to the ground. We must either deny the existence of the ice-sheet in the great Swiss valley, and find some other means of accounting for the travelled blocks on the Jura between Geneva and Soleure, or admit that the lower strata of a great glacier *can* travel up-hill and over hill and valley, and that the ice-sheets of the British Isles, of Scandinavia, and of North America merely exhibit the very same characteristics as those of Switzerland, but sometimes on a larger scale. We may not be yet able to explain fully how it thus moves, or what slope of the upper surface is required in order that the bottom of the ice may move up a given ascent, but the fact of such motion cannot any longer be denied.

Prof. T. E. Thorpe contributes a chatty paper on "Carl Wilhelm Scheele," whose life's work is summed up as follows:—

> We owe to Scheele our first knowledge of chlorine and of the individuality of manganese and baryta. He was an independent discoverer of oxygen, ammonia, and hydrochloric acid gas. He discovered also hydrofluoric, nitrosulphonic, molybdic, tungstic, and arsenic acids among the inorganic acids; and lactic, gallic, pyrogallic, oxalic, citric, tartaric, malic, mucic, and uric among the organic acids. He isolated glycerin and milk-sugar; determined the nature of microcosmic salt, borax, and Prussian blue, and prepared hydrocyanic acid. He demonstrated that plumbago is nothing but carbon associated with more or less iron, and that the black powder left on solution of cast iron in mineral acids is essentially the same substance. He ascertained the chemical nature of sulphuretted hydrogen, discovered arsenetted hydrogen and the green arsenical pigment which is associated with his name. He invented new processes for preparing ether, powder of algaroth, phosphorus, calomel, and *magnesia alba*. His services to quantitative chemistry included the discovery of ferrous ammonium sulphate, and of the methods still in use for the analytical separation of iron and manganese and for the decomposition of mineral silicates by fusion with alkaline carbonates.

To this long list of successful labours must be added the memoir on "Air and Fire," which appeared in 1777, and the experimental material for which was partly collected in Malmö and Stockholm before 1770, and partly during Scheele's stay at Upsala, that is, prior to 1776. These dates, Prof. Thorpe reminds us, are important in view of Scheele's relations as a discoverer to Priestley and Lavoisier.

"The Geographical Evolution of the North Sea" forms the subject of an article by Mr. A. J. Jukes-Browne in the *Contemporary*. In the course of the paper the following conclusion is arrived at:—

> The North Sea—that is to say, a sea lying east of Britain and opening northward—had no existence until after the formation of our Coralline Crag. The great change which submerged the northern land-barrier and permanently lowered the temperature of eastern England by letting in the waters of the Arctic Ocean took place during the formation of the newer "Crags" which overlie the Coralline Crag in Suffolk, and extend northward through Norfolk.
>
> In proof of this statement, two salient facts may be mentioned: (1) the incoming and gradual increase in the number of northern species among the mollusca of the newer Crags; (2) the occurrence of Crag shells in the glacial sands of Aberdeen, showing that marine Pliocene deposits once existed at no great distance from the Scottish coast and were destroyed by the ice of the Glacial Period.

According to Mr. Jukes-Browne, towards the close of the Pliocene period the whole area between East Anglia and the Netherlands appears to have become dry land. The estuary of the Rhine then lay off the coast of Norfolk, and the Thames was one of its tributaries. During the glacial epoch, the whole bed of the North Sea was dry land. The subsidence that afterwards submerged the North Sea floor and filled the valley of the English Channel with water, led to the silting up of the English river-valleys, and to the formation of the modern delta of the Rhine. Mr. Jukes-Browne believes that by it England was separated from the Continent; for there is no proof that a continuous sea separated England and France at any earlier Pleistocene epoch.

The *Forum* (October) contains a contribution by Prof. E. S. Holden, the object of which is "to detail the history of the remarkable 'new star' of 1892, in the constellation Auriga." On this side of the Atlantic, a detailed account is understood to mean a more or less minute narration of particulars; but Prof. Holden's paper shows us that in writing the history of a new star in detail, reference to some of the most important communications on the matter may be omitted. "The *Nova* was, no doubt, a star like our sun . . . ," says Prof. Holden. ". . . Let us imagine what fate ours would be, if our sun should suddenly increase in light and heat some hundreds of times, and then fall off some thousands," and so on. The learned Director of the Lick Observatory will find that there is very little, if any, evidence that Nova Aurigæ "resembles our sun" in physical constitution, which is the inference naturally put upon his remarks. We read that, "Nothing can be clearer than the identity of the 1893 spectrum of the *Nova* and that of the nebulæ"—a pill which some spectroscopists have had great difficulty in swallowing. Prof. Holden describes Prof. Seeliger's hypothesis of the genesis of the Nova, but inclines to Prof. Vogel's modification of it; for he remarks, "We can at least say that up to the present time the new star has behaved as if it had entered a system of distant planets, rather than a swarm of cosmical meteorites." This, however, is simply an expression of opinion, and the statements that might justify it are not discussed, for the reason that "they relate to the minutiæ of observation."

The *Quarterly Review* (October) contains an excellent account of Vedic mythology, which should be of interest to astronomers, since it deals chiefly with the relation of the sun and moon to mythological thought and language.

An article on "Waves," in *Good Words*, and one on "Electricity and Health," in the *Humanitarian*, deserve mention, though neither contain much of scientific importance.

The *Medical Magazine* contains Part I. of an article on "Heredity and Disease."

ON A METEORITE WHICH FELL NEAR JAFFERABAD IN INDIA ON APRIL 28, 1893.[1]

PARTICULARS have recently reached this country concerning the fall of a meteorite near Jafferabad in the south-east of Kathiawar, a native State adjoining the

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[1] Note read at the meeting of the Mineralogical Society, October 14, 1893.

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Bombay presidency. Dr. J. W. Evans, the geologist to the State of Kathiawar, has kindly forwarded to me a translation of the report sent in by the local official. It is curious that a fall of Nagali Jaowar (a kind of seed used as food by the poorer people of the country) is said to have occurred at the same time as the fall of the stone. As suggested by Dr. Evans, the seed may have been carried a short distance by the wind, which is very strong on the coast of Kathiawar at the time of year when the fall occurred. The spot where the fall took place is a flat region of recent limestone. Dr. Evans adds that the official report is interesting, as it is the account of a man who never heard of a meteorite, and to whom the fall of grain is as probable as that of stones. The report is as follows :—

"There was thunder which lasted for a quarter of an hour on the southern side at between a quarter to eight and eight o'clock in the morning of April 28, 1893. At that time the sky was clear enough. It has been known that the thunder was heard in nearly all the villages of Babariawad. The reason for my giving you this trouble is that Nagali Jaowar has rained with thunder on a small piece of ground near the outskirts of a village called 'Wad,' situate on the eastern bank of a river named 'Dhatarwadi,' and about two kosh (miles) distant from this place, but there was not a drop of rain-water. A specimen of Jaowar that has come down is sent herewith. A coolie, named Hamo Shiyal, while working in his field on the same day and at the same time, saw a stone about five or seven tolas (a tola = 180 grains) in weight falling on to the ground, about two fields distant, on the southern side of a village called Covaya, situated south-west of, and three kosh distant from this place, with the noise of thunder. He picked it up, and came to the village with it. While showing it to the people of the village, they broke it to pieces. As a specimen, one piece of the stone, out of the two pieces found by inquiry, is also sent herewith. There was not a drop of rain, and the sky was clear enough. Notwithstanding the clearness of the sky, it has been said that there was a thunderbolt. Such were the details of the occurrence on the morning of Friday, at between a quarter to eight and eight. If any further details come to notice, they will be reported to you.'

The original stone was shown by Dr. Evans' investigations to have been 3·7 centimetres long, 2·9 centimetres broad, and 2·3 centimetres thick. It was broken up by the villagers, and only the two largest portions have been recovered by the officials. These weigh respectively 17·4 and 16·3 grammes. The stone is said to have been cold when picked up, and no hole in the ground made by its fall was noticed. The larger fragment of this meteorite has been entrusted to me by my friend Dr. Evans, and Mr. L. Fletcher, F.R.S., of the British Museum, has kindly made a preliminary examination of it, the results of which I give in his own words :—

"The fragment of stone weighing 17·42 grams (3/5ths of an ounce), sent by Dr. Evans, is undoubtedly part of a true meteorite, as is seen at once on examination of the crust and the fractured surface. The crust formed during the passage of the stone through the earth's atmosphere is dull black in colour, and in parts so rough as to be scoria-like in texture. On direct comparison with the stones from other falls preserved in the British Museum it is seen that in these respects the Jafferabad stone is very similar to parts of Pavlograd, Bachmut, Middlesborough, Tourinnes-la-Grosse, Pohlitz, and Gross-Liebenthal. The crust, however, is very remarkable for its thickness, which a little exceeds a millimetre, and at one part even reaches two millimetres : in most meteoric stones the thickness of the crust does not exceed half a millimetre, and in very few cases reaches a millimetre : the thickness in this instance surpasses that of the crust of any specimen preserved in this collection : of the above-mentioned meteorites, Pavlograd approaches most nearly in this respect. The broken surface of the stone is very white in colour, and shows the usual metallic spangles of nickel-iron and troilite, white and tomback brown respectively ; the thin black veins, beginning at the crust and traversing the stone in various directions of former fracture, are unusually conspicuous, even more than in the case of the stone which fell at Gross Liebenthal in Russia on November 19, 1881, and which is very similar in its general characters. The aspect of the fracture is very uniform, and no round enclosures (chondrules) are to be distinguished. This, however, is often the case, even when chondrules are actually present, and in all probability a microscopic section of the Jafferabad stone, when allowed by the owner to be made, will reveal their presence. The specific gravity of the stone with crust is 3·55, and has an average value ; that of Pavlograd, for instance, is 3·58."

It will be seen from the foregoing account that the Jafferabad meteorite presents some features of considerable interest ; and it is to be hoped that, in the interest of science, his Highness the Nawab of Junagadh may permit the specimen now in this country to be subjected to a full microscopical and chemical examination.

JOHN W. JUDD.

NOTES.

THE following is a list of names recommended by the President and Council of the Royal Society for election into the Council for the year 1894, at the anniversary meeting on November 30 (the names of new officers are printed in italics) :—President : Lord Kelvin. Treasurer : Sir John Evans, K.C.B. Secretaries : Prof. Michael Foster and Lord Rayleigh, Foreign Secretary : *Sir Joseph Lister, Bart.* Other Members of the Council : Prof. Isaac Bayley Balfour, *Dr. Andrew Ainslie Common*, *Dr. Andrew Russell Forsyth*, Richard Tetley Glazebrook, *Prof. Alexander Henry Green*, *Sir John Kirk, K.C.B.*, *Prof. Oliver Joseph Lodge*, *Sir John Lubbock, Bart.*, William Davidson Niven, Dr. William Henry Perkin, The Marquis of Salisbury, K.G., *Prof. J. S. Burdon Sanderson*, Adam Sedgwick, *Prof. Thomas Edward Thorpe*, Prof. William Augustus Tilden, *Prof. W. Cawthorne Unwin.*

IT is with deep regret that we announce the death of Sir Andrew Clark, Bart., on November 6, at the age of sixty-seven.

BY the death of Prof. E. Lecouteux, France has lost one of its foremost agriculturists. Lecouteux was born at Créteil (Seine) in 1819. He was one of the founders, and afterwards a vice-president, of the Société des Agriculteurs de France. He was also at one time president of the Société Nationale d'Agriculture. Many important additions to agricultural literature were made by Lecouteux, and the effects of his beneficial influence will be apparent in France for many years to come.

THE Municipal Council of Paris has had an elegant album designed for M. Pasteur, containing the address presented to him in the name of the city of Paris at the celebration of his seventieth birthday in December of last year.

BRUSSELS UNIVERSITY will shortly have a laboratory of Psychological Physics, endowed by private munificence. The Rector, Prof. M. H. Denis, has nominated Drs. G. Dwelshauvers and P. Stroobant to take charge of the researches and practical work.

DR. JOHN ANDERSON, F.R.S., who for the past two years has been collecting materials in Egypt for a work on the mammals and reptiles of that country, is, we understand, again returning to Egypt to continue his researches, proceeding in the first instance to Suakin.

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